

BF

PCT

WORLD INTELLECTUAL PROPERTY ORGANIZATION  
International Bureau

## INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

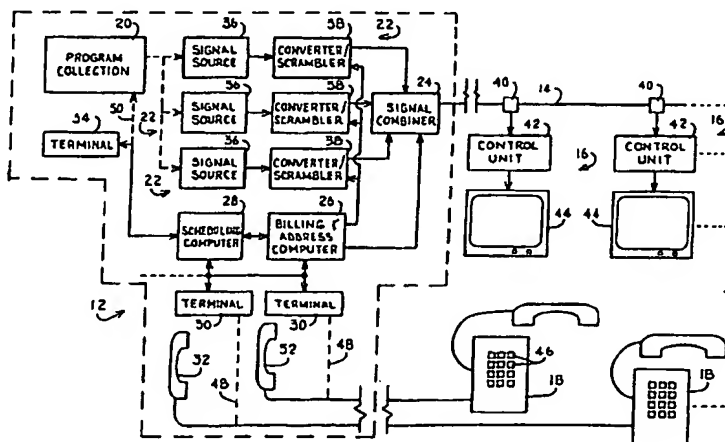
(51) International Patent Classification <sup>4</sup> : <b>H04N 7/167</b>		A1	(11) International Publication Number: <b>WO 89/12370</b>
			(43) International Publication Date: 14 December 1989 (14.12.89)
(21) International Application Number: <b>PCT/US89/02507</b>		(81) Designated States: AT (European patent), AU, BE (European patent), CH (European patent), DE (European patent), FR (European patent), GB (European patent), IT (European patent), JP, LU (European patent), NL (European patent), SE (European patent).  Published With international search report.	
(22) International Filing Date: <b>8 June 1989 (08.06.89)</b>			
(30) Priority data: 204,585                      9 June 1988 (09.06.88)                      US			
(71)(72) Applicant and Inventor: MONSLOW, H., Vincent [US/US]; 11815 Rosehill Road, Overland Park, KS 66210 (US).			
(72) Inventor: DICKEY, Steven, R.; 2009 West 103rd Street, Leawood, KS 66206 (US).			
(74) Agent: DICKEY, Steven, R.; Hovey, Williams, Timmons & Collins, 1400 Mercantile Bank Tower, 1101 Walnut Street, Kansas City, MO 64106 (US).			

(54) Title: TELEVISION BROADCAST SYSTEM FOR SELECTIVE TRANSMISSION OF VIEWER-CHOSEN PROGRAMS AT VIEWER-REQUESTED TIMES

## (57) Abstract

A television broadcast system using land lines (14) is provided for real-time transmission of a viewer-chosen program at a viewer-requested time to the requesting viewer's television receiver (16). The preferred method includes the steps of providing a collection of stored programs (20), communicating the requesting viewer's choice of a program chosen from the collection (20) and a requested time for viewing the chosen program, selecting the chosen program from a collection (20), transmitting the chosen program at the requested time for viewing on the requesting viewer's receiver (16), and preventing intelligible viewing of the chosen program on other of the receivers (44), other than that which

specifically requested the program selection. The preferred system (10) includes a central unit (12), land lines (14), a plurality of viewer-associated receivers (16), and a plurality of viewer-associated telephone handsets (18). Customers can communicate with customer service representative at telephone units (32) at the central station (12). Alternatively, customers can use their telephones (18) to communicate directly with the scheduling computer (28). The signal sources (36), the converter/scramblers (38), and the signal combiner prepare the plurality of requested programs for transmission over land line (14). Billing and addressing is controlled by billing and address computer (26).



**FOR THE PURPOSES OF INFORMATION ONLY**

Codes used to identify States party to the PCT on the front pages of pamphlets publishing international applications under the PCT.

AT	Austria	FI	Finland	ML	Mali
AU	Australia	FR	France	MR	Mauritania
BB	Barbados	GA	Gabon	MW	Malawi
BE	Belgium	GB	United Kingdom	NL	Netherlands
BF	Burkina Faso	HU	Hungary	NO	Norway
BG	Bulgaria	IT	Italy	RO	Romania
BJ	Benin	JP	Japan	SD	Sudan
BR	Brazil	KP	Democratic People's Republic of Korea	SE	Sweden
CF	Central African Republic	KR	Republic of Korea	SN	Senegal
CG	Congo	LI	Liechtenstein	SU	Soviet Union
CH	Switzerland	LK	Sri Lanka	TD	Chad
CM	Cameroon	LU	Luxembourg	TG	Togo
DE	Germany, Federal Republic of	MC	Monaco	US	United States of America
DK	Denmark	MG	Madagascar		
ES	Spain				

- 1 -

1                   TELEVISION BROADCAST SYSTEM FOR  
                  SELECTIVE TRANSMISSION OF VIEWER-CHOSEN  
                  PROGRAMS AT VIEWER-REQUESTED TIMES

5           Background of the Invention

1.   Field of the Invention

          The present invention relates to a commun-  
ity antenna television (CATV) system. More particu-  
larly, the present invention relates to a system in  
10       which a viewer can choose a program and request a  
time for viewing of the chosen program on the view-  
er's television receiver.

2.   Description of the Prior Art

          With over half the homes in the United  
15       States now equipped with video cassette recorders, a  
major industry has developed which includes thou-  
sands of video stores for renting movies and other  
programs on video cassettes in order to satisfy a  
demand for over three billion rentals a year. One  
20       of the reasons video tape cassette rentals have  
become so popular is that the viewer can rent a  
desired program cassette from the video store's  
assortment and then view that program whenever  
desired. This is in contrast to conventional broad-  
cast television or premium cable television in which  
25       the viewer neither chooses the program being trans-  
mitted nor the time at which it is transmitted.

          Even with the advantages of cassette rent-  
al, certain problems are apparent. For example, the  
viewer must make a first round-trip to the video  
30       store to pick up the desired program cassette and  
then make a second round-trip to return the cas-  
sette. Additionally, the viewer may make a trip to  
the video store only to find that the movie is  
unavailable either because all of the available

35

- 2 -

1 copies have already been rented, or that particular  
video store does not stock the desired movie. If  
such occurs, not only is the viewer inconvenienced,  
5 but the video store also loses potential rental  
revenue.

Furthermore, the existing system for  
renting video cassettes presents some inherent  
inefficiencies. For example, in order to minimize  
inconvenience to the customer, the video store must  
10 be located at a premium, high rent, location such as  
a corner intersection or a shopping mall and pay the  
high rent associated with the premium location.

Second, each video store must carry a  
complete library of video taped programs most of  
15 which are unused at any given time. For example, it  
a video tape store may carry an inventory of over  
5,000 program titles representing thousands more  
video cassettes owing to the duplication of many of  
the titles. The inventory problem is magnified if  
20 duplicate cassettes are stocked in VHS and BETA  
formats. At any given time, however, only a rela-  
tively small percentage of the titles will be rented  
which are typically the currently most popular pro-  
grams. Even with such a large inventory, the video  
store can satisfy relatively few requests for the  
25 most popular programs. That is to say, even if a  
number of copies of a currently popular program are  
in stock, the demand for this program may far exceed  
this number of copies and potential revenue is lost  
while other titles lie idle.

30 Third, the inventory problem for video  
rental stores is a growing one in that new titles  
are released to the video market each month with the  
result that the number of titles in a video store's  
inventory grows by at least this amount each month.

35

- 3 -

1       The physical space required to store these addition-  
al titles may grow at an even faster rate because  
more than one copy of each title may be purchased.  
In order to handle the ever increasing number of  
5       cassettes, the video store must increase its storage  
capacity for which it must pay a higher rent because  
of the store's premium location.

      In order to solve some of the problems  
associated with the video cassette rental industry,  
10       various prior art solutions have been proposed. For  
example, Patent No. 4,506,387 which is hereby incor-  
porated by reference discloses a system in which a  
cable television system (CATV) may download a re-  
cording from a central location over its cable trunk  
15       line to a memory module included in the viewer's  
television receiver. The program is downloaded in  
non-real time, typically in about 30 seconds, and  
the viewer then activates the memory module to view  
the program stored therein. The '387 patent pre-  
sents some disadvantages, however, in that the  
20       central location must be equipped to download the  
program in non-real time. Additionally, each view-  
er's receiver must be equipped with a memory module  
to store the downloaded program. Such equipment may  
be prohibitively expensive and may be also ineffi-  
25       cient in that a viewer's receiver must be properly  
equipped even though a particular viewer may seldom,  
if ever, desire to take advantage of the capability.

      Patent No. 4,381,522 which is hereby  
incorporated by reference discloses a system in  
30       which a viewer can telephone the cable company's  
central location and electronically select a spe-  
cialized recording such as a commercial advertise-  
ment for broadcast over one of the unused channels  
of the cable television system. A computer then

35

- 4 -

1 schedules the program, transmits it at the scheduled  
time, and separately transmits a directory of all of  
the scheduled programs on another unused channel.  
5 The viewer then observes the directory channel to  
see when the requested recording is scheduled, and  
then turns to the channel indicated at the scheduled  
time to view the program. The provision of the  
directory channel encourages other viewers to view  
one of the scheduled recordings also. The system as  
10 disclosed in the '522 patent does not allow the  
viewer to determine when the program is to be sche-  
duled and furthermore provides no means by which  
receivers other than the one of the requesting  
viewer are prevented from viewing the scheduled  
15 program.

#### Summary of the Invention

The present invention solves the problems  
as outlined above. The invention hereof allows a  
20 viewer to choose a program from a collection and to  
view that program at a viewer-requested time on the  
viewer's receiver for which the viewer is billed and  
which also prevents non-requesting viewers from  
intelligible viewing of the chosen program on their  
associated receivers. This allows a viewer to  
25 "rent" a program without the need for a VCR.

The present invention is advantageously  
and preferably implemented in the context of a tele-  
vision transmission system, typically a CATV system,  
which uses land lines such as coaxial cables or  
30 fiber optic cables for transmitting programs to a  
plurality of subscriber's receivers. Preferably,  
the television transmission system is an "address-  
able" system in which selected programs are scram-  
bled to prevent intelligible viewing thereof and in  
35

- 5 -

1        which a descrambling signal can then be addressed to  
the receiver associated with the requesting viewer  
which in turn prompts the included control unit to  
descramble the program transmission for viewing on  
5        that receiver.

The preferred method of the present invention involves the steps of providing a collection of stored programs, selecting a program chosen from the collection for transmission at a requested time in  
10        response to a request from a viewer, transmitting the chosen program in real-time over the system's land lines at the requested time, and preventing intelligible viewing of the chosen program at the requested time by receivers other than the request-  
15        ing viewer's receiver. More particularly, the preferred method includes the steps of scrambling the transmission of the chosen program and transmitting decoder signals to the requesting viewer's receiver in order to allow intelligible viewing of the chosen program thereon only by the requesting  
20        viewer and thereby preventing intelligible viewing by others.

Additionally, the preferred method also includes the steps of transmitting the chosen program at the requested time over a selected channel  
25        and communicating the identity of the selected channel only to the requesting viewer.

In preferred forms, the method hereof includes the steps of transmitting address signals specific to the control unit associated with the  
30        requesting viewer and transmitting associated descrambler signals specific to the selected channel over which the chosen program is being transmitted.

Advantageously, the preferred method includes the steps of identifying a section of the  
35

- 6 -

1 land lines having a subset of receivers operably  
coupled thereto, transmitting the chosen program  
over the section of the land lines, identifying a  
5 juncture between the section and the remaining  
portion of the land lines, and preventing transmis-  
sion of the chosen program therebeyond by use of a  
blocking device located at the juncture.

The preferred apparatus includes a collec-  
tion of stored programs, means for selectively  
10 choosing certain ones of the programs for transmis-  
sion, means for transmitting a chosen program at a  
requested time, and a scheduling computer for sche-  
duling program choices and requested times. The  
preferred apparatus also includes computer means for  
15 receiving information from the requesting viewer as  
encoded signals preferably over telephone lines  
using telephone touch-tones. In especially prefer-  
red forms, the computer means is equipped for voice  
communication with the requesting viewer either in  
20 the form of synthetically generated voice signals or  
prerecorded selected messages.

Other preferred aspects of the present  
invention are explained hereinbelow.

#### 25 Brief Description of the Drawing Figures

Figure 1 is schematic illustration of the  
preferred configuration of the present invention;

Fig. 2 is a schematic illustration showing  
the preferred interconnection between the configura-  
tion of Fig. 1 and sections of the transmission  
30 system.

#### Detailed Description of the Preferred Embodiments

The present invention is preferably imple-  
mented in the context of a conventional community  
35



- 7 -

1 antenna television (CATV) system, the equipment and  
operation of which are well understood by those  
skilled in the art and which are explained in part  
in the Electronics Engineer's Handbook, Second  
5 Edition, which is hereby incorporated by reference.

Preferred system 10 (Figs. 1) includes  
central unit 12, land lines 14, a plurality of  
viewer-associated receivers 16, and a plurality of  
viewer-associated telephone handsets 18.

10 Central unit 12 includes program collec-  
tion 20, a plurality of signal transmitters 22,  
signal combiner 24, billing and address computer 26,  
scheduling computer 28, a plurality of input data  
computer terminals 30 having associated telephone  
15 units 32, and output schedule computer terminal 34.

Program collection 20 includes a plurality  
of programs stored on a medium allowing selective  
reproduction and real-time transmission thereof over  
land lines 14 for reception by and viewing on re-  
ceiver 16 by an associated viewer. Preferably, the  
20 programs stored in collection 20 are stored on 3/4"  
video tape which allows for higher fidelity repro-  
duction than conventional 1/2" video tape. Each  
program is preferably assigned and labeled with a  
catalog number, a list of which is stored in sche-  
duling computer 28. Preferably, up to three copies  
25 of selected programs are included in collection 20  
which to allow continuous transmission of ninety-  
minute programs at half-hour intervals if desired  
for currently popular programs.

30 As those skilled in the art will appreci-  
ate, the programs in collection 20 can be stored on  
a variety of media including compact disks, floppy  
disks, hard disks, conventional magnetic tape, elec-  
tronic memory such as that disclosed in U.S. Patent

35

- 8 -

1 No. 4,506,387, or the like. While storage on video  
tape is preferred, available technology and economic  
factors may dictate an alternative storage medium.

5 Signal transmitters 22 are conventional  
units commonly found in the "head end" of a typical  
CATV system. Signal transmitter 22 includes signal  
source 36 and converter/scrambler unit 38.

10 Signal source 36 in a typical CATV system  
is the origination point for signals received by way  
of antenna, microwave, land lines from a local  
television station, or a video cassette recorder  
(VCR). Preferred signal source 36 includes a 3/4"  
15 video cassette recorder (VCR) operable to receive  
and play video cassettes selected from collection 20  
and to produce signals representative thereof for  
presentation to converter/scrambler unit 38.

20 Conventional converter/scrambler unit 38  
receives signals from signal source 36 and converts  
those signals for output on a predetermined fre-  
quency channel. In a conventional system, these  
channels include low band, mid-band, high band,  
super band, and hyper band, which, depending upon  
the design of the system, may allow selection of up  
to seventy different channels for program trans-  
mission on a single coaxial cable trunk line. In  
25 the preferred system, unit 38 is operable to selec-  
tively scramble program transmissions.

30 Conventional signal combiner 24 receives  
the output signals from transmitters 22 on the  
various channels and combines those signals for  
transmission over land lines 14. Signal combiner 24  
is also typically coupled with conventional billing  
and address computer 26.

35 Computer 26 is operable to transmit decod-  
er signals by way of signal combiner 24 onto land

- 9 -

1 lines 14 and thereby to receivers 16 which allows  
intelligible viewing of scrambled program transmis-  
sion on selected ones of receivers 16 and prevents  
intelligible viewing on others. That is to say,  
5 computer 16 keeps track of which viewers which have  
subscribed to certain premium channels such HBO, and  
periodically transmits decoder signals which include  
address signals specific to receivers 16. Descram-  
bling signals are typically associated with the  
10 address signals which prompts the addressed receiver  
16 to descramble the transmissions identified by the  
associated descrambler signals. Receivers 16 which  
do not receive descrambling signals associated with  
their respective address signals prevent intelli-  
gible viewing of the scrambled program transmission.  
15

Computer 26 is also operable for producing  
billing information as appropriate for the services  
to which the individual viewers have subscribed. As  
those skilled in the art will appreciate, the vari-  
ous functions performed by computer 26 may be per-  
20 formed by separate computers.

Scheduling computer 28 is preferably a  
minicomputer and is operably coupled with terminals  
30, with computer 26, and with terminal 34. As will  
be explained further hereinbelow, computer 28 re-  
25 ceives data representative of the program choices  
and requested times for viewing thereof and presents  
outputs at terminal 34 whereby the chosen program  
can be selected from collection 20 for transmission  
by the respective signal transmitter 22 at the  
30 requested time.

In one embodiment, viewers communicate  
their program choices and requested viewing times by  
way of conventional telephone handsets 18 connected  
through the local telephone network. Respective  
35

- 10 -

1 customer service representatives answer the incoming  
calls over phone units 32 and then enter the infor-  
mation communicated from the viewers into scheduling  
computer 28 by way of respective terminals 30, each  
5 of which includes a conventional data entry keyboard  
and monitor.

Land lines 14 typically include coaxial  
cables which transmit the programs from program unit  
12 to receivers 16. Receivers 16 are conventially  
10 coupled with land lines 14 by way of respective  
cable taps 40.

Receivers 16 each include control unit 42  
and television 44. Control unit 42 converts a  
program transmission received from land lines 14 on  
15 one of the various transmission channels to an  
output on a preselected channel for reception by  
television 24.

Control unit 42 is also operable to selec-  
tively descramble certain of the transmissions  
received by way of land lines 14 from central unit  
20 12. Each control unit 42 is equipped to receive  
decoder signals to detect its specific address  
signal from computer 26 and in response to descram-  
ble the transmission identified by the descrambling  
signals associated with the address signals.

25 In the preferred method of operating  
system 10, each subscribing household is provided  
with a catalog of the programs included in collec-  
tion 20 along with the associated program identifi-  
cation number by which scheduling computer 28 iden-  
30 tifies the program and by which they are labeled and  
stored in collection 20. Preferably, monthly sup-  
plements to the program catalog are provided as new  
programs are added to collection 20 and new catalogs  
are periodically issued incorporating the previous

35

- 11 -

1 supplements as needed. The program listings in the  
catalog are preferably arranged alphabetically and  
also by subject category to facilitate selection of  
5 a desired type of program. Collection 20 includes  
full-length movies, recordings of previously trans-  
mitted regularly scheduled commercial broadcasts and  
other programs of interest to the subscribers. Each  
subscribing household is preferably provided with a  
confidential identification number in order to prevent  
10 unauthorized ordering and thereby billing of a  
program.

After a viewer has chosen a program, the  
viewer then uses telephone handset 18 to place a  
telephone call over the conventional telephone  
15 network to the telephone number associated with  
central unit 12. Customer service representatives  
answer the incoming telephone calls to whom the  
viewer communicates the program choice and requested  
time along with the viewer's name and confidential  
20 identification number. The customer service repre-  
sentative then enters this information by way of  
terminal 30 into computer 28.

In accordance with conventional computer  
programming techniques well known to those skilled  
in the art, computer 28 first determines whether the  
25 viewer's name and identification number match. If  
not, this fact is communicated to the representative  
who informs the viewer that the request cannot be  
satisfied without a correct match. If the customer  
name and identification number do match, computer 28  
30 then determines whether the chosen program has been  
already previously scheduled at the requested time.  
If such is the case, computer 28 need not reschedule  
the chosen program, but rather needs only prompt  
address computer 26 to transmit proper decoding

35

- 12 -

1 signals to the viewer's control unit 16 at the  
requested time to allow the viewer's receiver to  
descramble the program and to enter the billing  
information.

5 If the chosen movie has not been previous-  
ly scheduled at the requested time, computer 28  
determines whether a channel is available at the  
requested time. If yes, computer 28 selects an  
available channel and schedules this channel for  
10 transmission of the chosen program at the requested  
time. Computer 28 then presents confirmation of  
this to the customer service representative on the  
monitor associated with terminal 30 along with the  
channel number which is then communicated to the  
viewer.

15 Computer 28 provides scheduling informa-  
tion as output by way of terminal 34. In the pre-  
ferred form, an operator reads the output from  
terminal 34 either presented on an associated moni-  
tor or as a hard copy print out. In response, the  
20 operator selects the chosen program from collection  
20 and inserts into the appropriate VCR included in  
signal source 36 which is associated with the sche-  
duled channel. That is to say, each transmitter 22  
is associated with a specific output channel and the  
25 information provided from computer 28 by way of  
terminal 34 instructs the operator which VCR is to  
be used for transmitting the chosen program at the  
requested time. In the alternative, system 10 could  
be arranged such that any unused signal transmitter  
30 22 can be selected and then adjusted to transmit on  
the scheduled channel. At the requested time the  
operator activates the appropriate VCR in order to  
transmit the program which is scrambled and convert-

35

- 13 -

1       ed by unit 38 and presented on the selected channel  
to signal combiner 24 and onto land lines 14.

5       Computer 28, upon scheduling the chosen  
program at the requested time, also interacts with  
computer 26 so that computer 26 sends appropriate  
decoder signals at the requested time and during  
transmission of the program to receiver 16 associ-  
ated with the requesting viewer. The decoder sig-  
nals include address signals specific to control  
10       unit 16 associated with the requesting viewer and  
prompts control unit 42 to descramble the chosen  
program in accordance with the descrambler signals  
associated with the address signal. In this way,  
the requesting viewer can view the program on the  
viewer-associated television 44. By scrambling the  
15       transmission, and by not providing a descrambling  
signal to other receivers, subscribers other than  
the requesting viewer are prevented from intelli-  
gible viewing of the chosen program.

20       Upon transmission of the chosen program at  
the requested time, billing and address computer 26  
is programmed to automatically add the specified  
program charge to the requesting viewer's monthly  
bill.

25       If there are no available channels at the  
requested time, computer 28 is preferably programmed  
to determine the nearest available time frame during  
which a channel is available or to determine the  
nearest available time when the chosen program is  
already scheduled for transmission. This informa-  
tion is then presented to the customer service  
30       representative on terminal 30 who in turn communi-  
cates this information to the requesting viewer who  
may thereupon select one of the alternative times.  
For example, if the requesting viewer wishes to see

35

- 14 -

1 a very popular program at a certain time, and all of  
the channels are already scheduled for that time,  
none of which include that chosen program, an unused  
5 channel may be available shortly before or after the  
requested time or the chosen program may be already  
be rescheduled at a nearby time whereupon the re-  
questing viewer can select one of these.

As discussed above, scheduling computer 28  
is programmed to ensure that the viewer's identi-  
10 cation number matches the name of the requesting  
viewer, or the requesting viewer's address, and so  
forth. As a further check, computer 28 can be pro-  
grammed to also include the requesting viewer's  
telephone number, and upon being provided with this  
15 information, can double check this against the  
confidential identification number and the request-  
ing viewer's name and address. This provides addi-  
tional assurance that unauthorized persons do not  
schedule programs which would be billed against  
20 another subscriber's account.

As those skilled in the art will appreci-  
ate, the requirement for a customer service repre-  
sentative to answer telephone 32 can be eliminated  
by the provision of a so-called "auto-dial" device  
25 which would allow the requesting viewer to communi-  
cate directly with scheduling computer 28 by provid-  
ing appropriate encoded signals such as those pro-  
vided by buttons 46 as touch-tone signals from  
telephone handset 18. Such systems are well known  
to those skilled in the art and are commonly used in  
30 banking services whereby customers can conduct  
transactions with their financial accounts. Such  
systems often include voice response systems which  
can be incorporated in computer 28 to provide verbal  
messages by way of synthesized voice or prerecorded  
35



- 15 -

1 verbal messages. The requesting viewer can respond  
to inquiries by the computer by entering the appropriate codes on push buttons 46. Such an interconnection with computer 28 by way of terminal 30 is  
5 indicated by the dashed lines 48.

Those skilled in the art will also appreciate that the information from the requesting viewer can be communicated to central unit 12 by using land lines 14 such as with an interactive  
10 cable system. Such systems are well known such as those described in U.S. Patent Nos 4,290,142, 4,408,345, and 4,710,955 which are hereby incorporated by reference.

As discussed above in connection with U.S.  
15 Patent No. 4,506,387, program collection 20 can include programs stored in electronic memory. If such is preferred, computer 28 can be connected directly with collection 20 as represented by line 50. In addition, collection 20 can be directly  
20 coupled with signal sources 36 as illustrated by lines 52. With such an arrangement, the requirement for an operator to physically select the programs from collection 20 and in to insert them in the appropriate VCR is eliminated. That is to say, upon  
25 instructions from scheduling computer 28, collection 20 is operable to cause the chosen program to be transmitted directly to the appropriate signal source 36 for the scheduled channel at the requested time.

While the present invention is discussed  
30 in the environment of a conventional CATV system using coaxial cables such as land lines 14, the present invention is also useful in the context wherein land lines 14 are fiber optic cables or telephone lines. Fiber optic cables have the capa-

35

- 16 -

1 bility of carrying many more channels than a coaxial  
cable with repeaters spaced further apart and with  
somewhat greater immunity to external noise. In  
such a system, conventional telephone communication  
5 may also be provided over such a fiber optic cable  
or, in the alternative, a separate key pad, key-  
board, or the like can be included as part of re-  
ceiver 16 whereby the requesting viewer can enter  
data representative of the chosen program and  
10 requested time for transmission over the land lines  
14 directly to computer 28.

A typical cable television system using a  
coaxial cable as a trunk line may have upwards of  
fifty channels unused for regularly scheduled trans-  
missions. With the potential for a thousands of  
15 receivers connected to the system, fifty unused  
channels may not be adequate to supply the demand  
viewer-chosen program viewing. It should be appre-  
ciated, however, that in this example, fifty avail-  
able channels can still satisfy the program choice  
20 demands of many thousands of subscribers. For  
example, fifty channels transmitting the fifty most  
popular programs of the day may satisfy up to 80% of  
the program requests. It would not be unexpected  
that many subscribers may request the most popular  
25 program. This, coupled with the fact that all of  
the subscribers will not likely be requesting movies  
at the same time, may allow fifty available channels  
to serve many subscribers.

Nevertheless, there may be some upper  
30 limit as to the number of subscribers that the  
available channels can adequately serve. In order  
to provide the optimum service to the subscribers in  
a system, the present invention encompasses the  
configuration as illustrated in Fig. 2. A typical  
35

- 17 -

1 CATV system includes a head end 52 at which the  
transmitted program originates and which in turn  
transmits the programs on the various channels by  
way of land lines 14. In the preferred embodiment  
5 as illustrated in Fig. 2, land lines 14 are further  
designated to include a plurality of sections of  
which sections 54 and 56 are illustrated. Each sec-  
tion 54, 56 includes a respective subset 58 and 60  
of receivers respectively coupled thereto. Each  
10 section 54, 56 and so forth is respectively coupled  
to the remaining portions of land lines 14 at a  
respective node or juncture 62, 64.

In the preferred embodiment of the present  
invention, a central unit is provided for each  
subsection. Two such central units 12 and 66 are  
15 illustrated and are respectively coupled via lines  
68 and 70 with respective sections 54 and 56.  
Furthermore, respective blocking devices 72 and 74  
are provided at junctures 62 and 64 respectively.

Blocking devices 72 and 74 are preferably  
20 low pass filters which allow transmissions from head  
end 52 transmitted at the lower frequency channels  
to pass unimpeded therethrough. Viewer-chosen  
programming is preferably transmitted at the higher  
frequency channels directly to the respective sec-  
25 tions 54, 56. Blocking devices 72 and 74 prevent  
transmission of these higher frequency channels  
beyond their respective sections so that they do not  
interfere with one another. That is to say, each  
program unit 12 and 66 can broadcast viewer-chosen  
30 programs on the same channel frequencies but the  
sections are isolated from one another by the block-  
ing devices.

Sections of land lines 14 can be identi-  
fied and designated as desired by the proper place-

35

- 18 -

1       ment of a blocking device such that each program  
unit can adequately serve the program requests of  
the viewers associated with the subset of receivers  
included in each subsection. For example, if a CATV  
5       system has 50,000 subscribers, and it is determined  
that fifty channels can adequately satisfy the  
viewer-chosen program requests of 10,000 viewers,  
five sections of 10,000 receivers each would be  
designated with a blocking device installed at the  
10       juncture between each designated section and the  
remaining portions of the land lines. In this way,  
transmissions produced by separate central units on  
the same channels to separate sections would not  
interfere with one another. This arrangement effec-  
15       tively multiplies the number of available channels  
for viewer-chosen programs.

As preferred, central units 12, 66 and so  
forth, are located in physical proximity with head  
end 52 to take advantage of already existing equip-  
ment. It should be appreciated, however, that even  
20       with multiple central units, multiple scheduling  
computers, billing, and address computers may not be  
needed. That is to say, a single set of appropri-  
ately selected computers can serve all of the cen-  
tral units. Additionally, economy of a scale may  
25       dictate that all of the central units use a common  
program collection 20 in order to minimize the size  
of the inventory. Furthermore, the various program  
units may also share a common set of incoming tele-  
phone lines for communicating with requesting view-  
30       ers.

As an alternative, however, and depending  
upon the configuration of the CATV network and the  
economics involved, it may be desirable to locate a  
totally independent and free-standing program unit  
35

- 19 -

1 physically adjacent its associated section of the  
land lines or physically adjacent another location  
such as the central administrative office of the CATV  
transmission system. That is to say, those skilled  
5 in the art will appreciate that the physical location of the program unit and whether multiple program units can use common equipment is a matter of design choice dictated by technology, economics, and so forth.

10 Those skilled in the art will also appreciate that blocking devices 62, 64, and so forth may include distribution repeaters or amplifiers which are designed to amplify the frequency channels emanating from head end, but by their nature inherently block passage of the higher frequency channels  
15 from the various sections to the remaining portions of land lines 14. This can be implemented by coupling line 68, immediately "downstream" of the repeater nearest juncture 62. Other repeaters downstream of this blocking repeater receive and amplify all  
20 the incoming transmissions including the transmissions from the head end and those injected at juncture 62.

As should now be apparent from the description above, the present invention allows a  
25 requesting viewer to choose a program for viewing at a requested time on the television receiver associated with the requesting viewer. The convenience provided thereby eliminates the need for the viewer to drive to a video store to pickup a chosen movie  
30 on video tape and to again repeat the trip to return the movie.

Additionally, the present invention minimizes the risk that the viewer will be unable to view the chosen program at the viewer requested  
35

- 20 -

1 time. This risk is minimized for two reasons.  
First, the preferred embodiment hereof designates  
sections of the land lines which are matched from a  
capacity standpoint with its associated program unit  
5 in order to satisfy the demands of the viewers  
associated therewith. Secondly, the present inven-  
tion allows as many viewers as are connected to the  
system to choose the same program at the same time.  
This is because once the chosen program is scheduled  
10 for transmission on a particular channel, additional  
viewers can be added simply by transmitting the  
appropriate descrambling signals to the requesting  
viewer's receiver. In this way, many viewers can  
choose the currently most popular program rather  
15 than just a few as determined by the number of  
cassette copies available as with prior art video  
stores.

The present invention also avoids the need  
for premium rental space in which to store a large  
20 inventory of programs and eliminates the many dupli-  
cations of inventory carried by the many video  
stores in a territory.

Having thus described the preferred em-  
bodiments of the present invention, the following is  
25 claimed as new and desired to be secured by Letters  
Patent:

30

35

- 21 -

1       Claims

5           1.   A method of operating a television  
transmission system using land lines for transmit-  
ting television programs for reception by a plural-  
ity of receivers coupled with land lines for viewing  
the programs on the receivers by viewers respective-  
ly associated therewith, the system including means  
for selectively preventing intelligible viewing of  
10       certain programs by certain receivers, said method  
comprising the steps of:  
          providing a collection of stored programs  
          stored on a medium allowing selective  
          reproduction and real-time transmission of  
15       said stored programs over the land lines;  
          selecting a prospective chosen program from  
          said collection for transmission at a  
          requested time in response to a request  
          therefor from a requesting viewer;  
20       transmitting said chosen program in real-time  
over the land lines at said requested time  
for reception by and viewing on a receiver  
associated with said requesting viewer;  
          and  
25       preventing intelligible viewing of said chosen  
program at said requested time on receiv-  
ers other than said receiver associated  
with said requesting viewer.

30

35

- 22 -

1

2. The method as set forth in claim 1,  
the system including --

5

scrambler means operably coupled with said land  
lines for selectively scrambling the  
transmission of certain of the program  
transmissions in order to prevent intelli-  
gible viewing thereof on the receivers,

10

a plurality of control units respectively  
corresponding to and operably associated  
with the receivers and operably coupled  
with the land lines, each control unit  
being operable for receiving decoder  
signals and in response thereto for selec-  
tively descrambling certain ones of the  
program transmissions for allowing intel-  
ligible viewing thereof on the associated  
receiver; and

15

20

decoder signal means operably coupled with the  
land lines and operable for selectively  
transmitting decoder signals for reception  
by the receivers in order to allow intel-  
ligible viewing of certain ones of the  
programs on selected ones of the receiv-  
ers, said method further including the  
steps of --

25

scrambling the transmission of said chosen  
program in order to prevent intelligible  
viewing thereof on the receivers, and  
transmitting decoder signals for receipt by  
said receiver associated with said re-  
questing viewer in order to allow intel-  
ligible viewing of said chosen program  
thereon.

30

35



- 23 -

1                   3.    The method as set forth in claim 1,  
the system including means for simultaneously trans-  
mitting a plurality of programs on a respective  
plurality of identifiable channels, the receivers  
5       being operable for tuning to a selected channel,  
said method further including the steps of --  
transmitting said chosen program during said  
requested time over a selected channel,  
and  
10       communicating the identity of said selected  
channel only to said requesting viewer.

15

20

25

30

35

- 24 -

1                   4. The method as set forth in claim 2,  
the system including means for transmitting a plu-  
rality of programs on a respective plurality of  
5                   identifiable channels, the control units being oper-  
able for tuning to a selected channel, the decoder  
signals including address signals respectively  
specific to the control units and descrambler sig-  
nals respectively associated with the address sig-  
nals and respectively specific to identify selected  
10                  transmissions each control unit being responsive to  
specific address signals and the descrambler signals  
associated therewith for descrambling program trans-  
missions on the channels identified by the descram-  
bler signals, said method further including the  
15                  steps of --

                  selecting a channel for transmission,  
transmitting said chosen program during said  
                  requested time on said selected channel,  
communicating the identity of said selected  
20                  channel only to said requesting viewer,  
transmitting address signals specific to the  
control unit associated with the request-  
ing viewer's receiver and transmitting  
associated descrambler signals specific to  
25                  identify said selected channel.

30

35

- 25 -

1           5. The method as set forth in claim 1,  
further including the steps of --  
          identifying a section of the land lines having  
          a subset of receivers operably coupled  
5           thereto wherein said subset includes a  
          plurality of receivers less than the total  
          number of receivers included in the sys-  
          tem, and remaining portions of the land  
          lines having a plurality of receivers  
10          other than said subset coupled thereto,  
          transmitting said chosen program over said  
          section of the land lines,  
          identifying a juncture between said section and  
          said remaining portion, and  
15          preventing transmission of said chosen program  
          beyond the juncture from said section to  
          said remaining portion by use of a block-  
          ing device located at said juncture.

20          6. The method as set forth in claim 1,  
further including the steps of --  
          providing computer means operable for receiving  
          from said requesting viewer encoded sig-  
          nals representative of said chosen pro-  
          gram, said requested time, and the iden-  
25          tity of said receiver associated with said  
          requesting viewer,  
          said selecting step including the step of  
          selecting said chosen program from said  
          collection in response to said encoded  
30          signals from said requesting viewer.

          7. The method as set forth in claim 1,  
said encoded signals including telephone touch-tone  
signals.

35

- 26 -

1

8. The method as set forth in claim 6, further including the step of providing said computer means with voice interaction capability and using said computer for providing voice communication to said requesting viewer.

5

10

9. The method as set forth in claim 1, further including the steps of providing scheduling computer means operable for scheduling multiple program choices and multiple requested times.

15

10. The method as set forth in claim 9, further including the steps of --  
providing computer means for providing billing information correlated with the requesting viewer's chosen program, and  
providing a bill to said requesting viewer corresponding to said chosen program.

20

11. The method as set forth in claim 1, further including the step of providing electronic memory means having said collection stored therein.

25

12. The method as set forth in claim 1, the land lines including coaxial cables.

30

13. The method as set forth in claim 1, the land lines including fiber optic cables.

35

- 27 -

1           14. In a television transmission system  
using land lines for transmitting programs for  
reception by a plurality of television receivers  
coupled with the land lines for viewing of the  
5       programs on the receivers by viewers respectively  
associated therewith, and including communicating  
means for communicating information as encoded  
signals over the land lines from said viewers, the  
improvement comprising:

10           a collection of stored programs stored on a  
medium allowing selective reproduction and  
real-time transmission over the land lines  
for reception and viewing thereof by  
selected receivers;

15           computer means operably coupled with the com-  
municating means for receiving encoded  
signals from a requesting viewer, said  
encoded signals being representative of a  
requesting viewer's choice of a program  
20       chosen from said collection and said  
requesting viewer's requested time for  
viewing of said chosen program on a re-  
ceiver associated with said requesting  
viewer and for providing output informa-  
tion representative thereof;

25           selecting means operably associated with said  
collection and said computer means and  
responsive to said output information for  
selecting said chosen program from said  
collection; and

30           transmitting means operably associated with and  
responsive to said selecting means for  
transmitting said chosen program over the  
land lines at said requested time for  
reception by and viewing on said request-  
35       ing viewer's receiver.

- 28 -

1

15. The apparatus as set forth in claim 14, the communicating means including telephone lines, the encoded signals including touch-tone signals, said computer means including means for providing voice communication to said requesting viewer over the telephone lines.

5

10

16. The apparatus as set forth in claim 15, the system including means for transmitting programs on a respective plurality of channels,

15

said computer means including means for scheduling one of the channels for transmission of said chosen program thereon and including means for providing voice communication over the telephone lines identifying the channel on which said chosen program is to be transmitted to the requesting viewer.

20

25

30

35

- 29 -

1                   17. In a television transmission system  
using land lines for transmitting programs for  
reception by a plurality of television receivers  
coupled with land lines for viewing of the programs  
5                   on the receivers by viewers respectively associated  
therewith, the system further including communicat-  
ing means for receiving information over land lines  
from the viewers, the land lines including a section  
thereof having a subset of the receivers coupled  
10                   therewith wherein said subset includes a plurality  
of receivers less than the total number of receivers  
included in the system, the remaining portion of the  
land lines having a plurality of receivers other  
than the subset coupled therewith, the section and  
15                   the remaining portion being coupled with one another  
at a juncture, the improvement comprising:

                  a collection of stored programs stored on a  
                  medium allowing selective reproduction and  
                  real-time transmission thereof over the  
20                   land lines for reception and viewing  
thereof by selected receivers;

                  receiving means operably associated with the  
                  communicating means for receiving informa-  
                  tion from a requesting viewer, said infor-  
                  mation including a requesting viewer's  
25                   choice of a program chosen from said  
collection and a requested time for view-  
ing of said program on a receiver associ-  
ated with said requesting viewer, said  
associated receiver being included in the  
30                   subset of receivers;

                  selecting means operably associated with said  
                  collection and operably associated with  
                  and responsive to said receiving means for

35

- 30 -

1           selecting said chosen program from said collection;

5           transmitting means operably associated with said selecting means and coupled with the subsection of the land lines for transmission of said chosen program at said requested time for reception by and viewing one on said associated receivers; and

10          blocking means located in the vicinity of the juncture for preventing transmission of the chosen program therebeyond from the section into the remaining portions of the land lines.

15          18. The apparatus as set forth in claim 17, the system including means for simultaneously transmitting selected programs over a respective plurality of channels included in a specified group of channels,

20          said transmitting means including means for transmitting said chosen program on a selected channel other than the channel included in said selected group of channels,

25          said blocking means including structure allowing passage of programs being transmitted on the channels included in the selected group and structure for preventing passage of transmissions on said selected channel from the section to the remaining portion  
30          of the system.

35



- 31 -

1

19. The apparatus as set forth in claim 18, said selected channel being at a relatively higher frequency than the channels in the specified group.

5

10

15

20

25

30

35

1/2

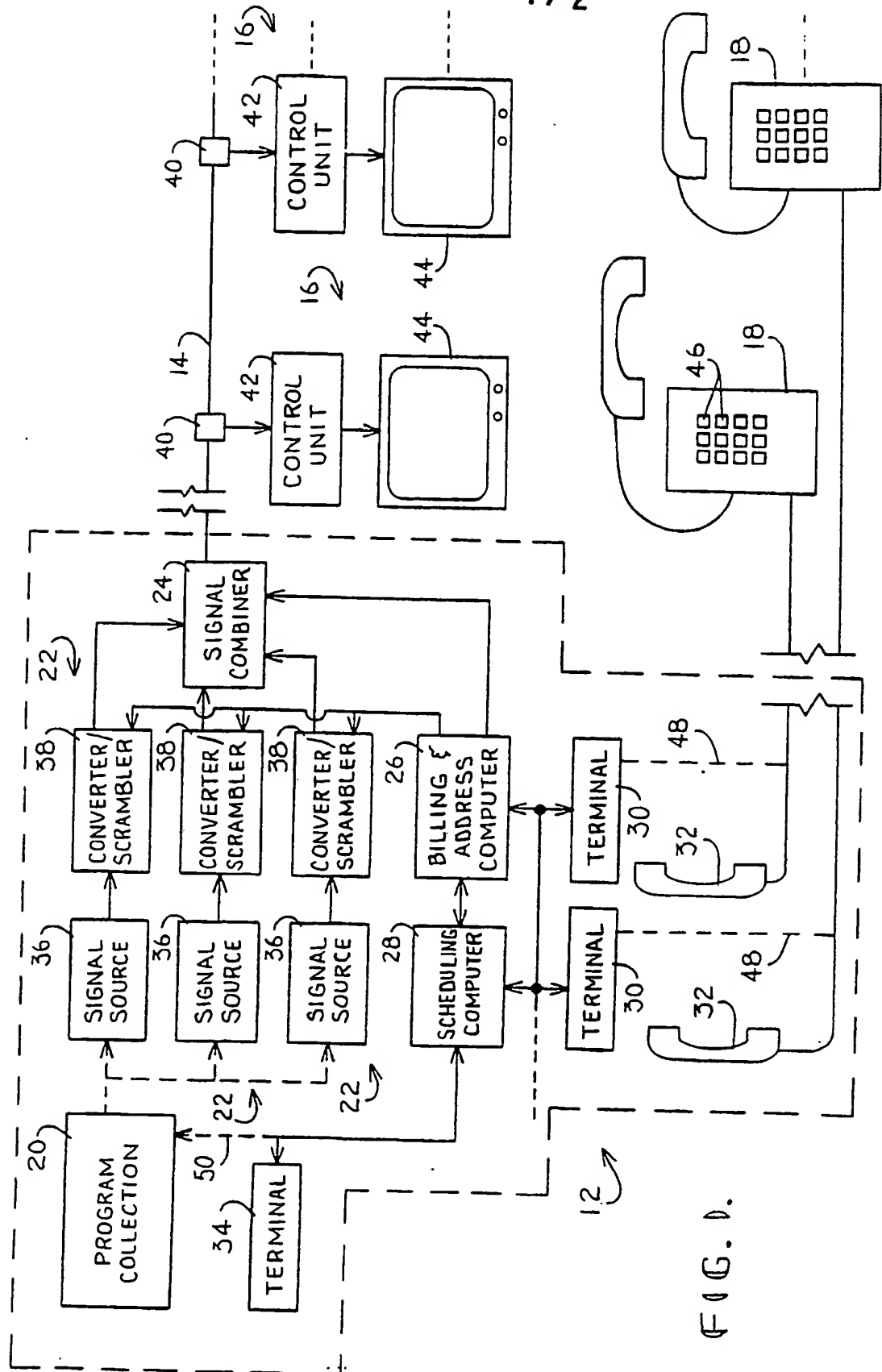


FIG. 1.

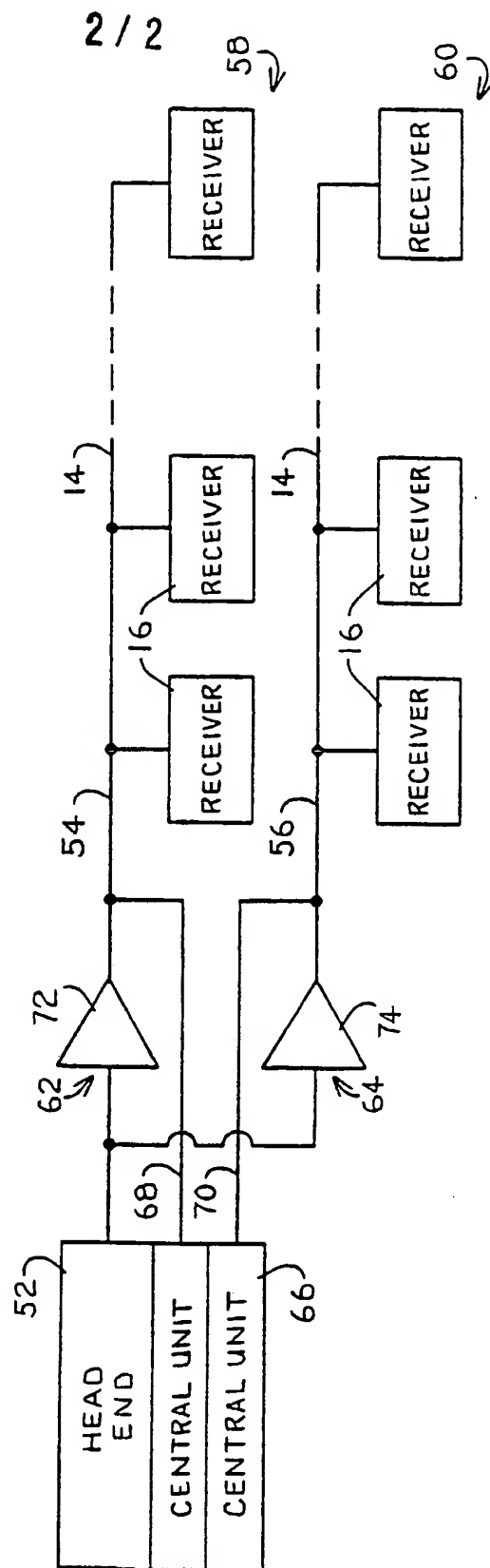


FIG. 2.

# INTERNATIONAL SEARCH REPORT

International Application No. PCT/US89/02507

<b>I. CLASSIFICATION OF SUBJECT MATTER</b> (If several classification symbols apply, indicate all) 3		
According to International Patent Classification (IPC) or to both National Classification and IPC		
INT. CL. <sup>4</sup>	H04N 7/167	U.S. CL. 380/10
<b>II. FIELDS SEARCHED</b>		
Minimum Documentation Searched *		
Classification System :	Classification Symbols	
U.S.	358/85,86 380/3,5,7,10 455/3,4,5,6	
Documentation Searched other than Minimum Documentation to the Extent that such Documents are Included in the Fields Searched *		
<b>III. DOCUMENTS CONSIDERED TO BE RELEVANT</b> 14		
Category *	Citation of Document, 14 with indication, where appropriate, of the relevant passages 12	Relevant to Claim No. 14
A	US, A, 4,251,691 Published 17 February 1981, Kakiyara et al.	1,14,17
Y	US, A, 4,381,522 Published 26 April 1983, Lambert, abstract.	1-19
A	US, A, 4,710,955 Published 01 December 1987, Kauffman.	1,14,17
A,P	US, A, 4,761,684 Published 02 August 1988, Clark et al.	1,14,17
Y,P	US, A, 4,763,191 Published 09 August 1988, Gordan et al., abstract.	1-19
A,P	US, A, 4,785,472 Published 15 November 1988, Shapiro.	1,14,17
<p>* Special categories of cited documents: 15</p> <p>"A" document defining the general state of the art which is not considered to be of particular relevance</p> <p>"E" earlier document but published on or after the international filing date</p> <p>"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)</p> <p>"O" document referring to an oral disclosure, use, exhibition or other means</p> <p>"P" document published prior to the international filing date but later than the priority date claimed</p> <p>"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention</p> <p>"X" document of particular relevance: the claimed invention cannot be considered novel or cannot be considered to involve an inventive step</p> <p>"Y" document of particular relevance: the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art</p> <p>"3" document member of the same patent family</p>		
<b>IV. CERTIFICATION</b>		
Date of the Actual Completion of the International Search :		Date of Mailing of this International Search Report *
08 August 1989		06 SEP 1989
International Searching Authority :		Signature of Authorized Officer :
ISA/US		Bernarr Earl Gregory

III. DOCUMENTS CONSIDERED TO BE RELEVANT (CONTINUED FROM THE SECOND SHEET)

Category *	Citation of Document, with indication, where appropriate, of the relevant passages *	Relevant to Claim No *
------------	--	------------------------

Y, P	US, A, 4,792,849 Published 20 December 1988, Mc Calley et al., abstract.	1-19
------	---	------